Dr. Tom Meyers, Director
Advanced Technology Office (ATO)
Office Closing Remarks

As you can see, whether it's drawing on cutting-edge communication networks to take killer-ap concepts like the self-healing minefield from the drawing board to the battlefield...or de-conflicting the spectrum, replacing the current condition of scarcity with a white space of possibility...whether it's moving from single-to multi-function communications platforms that allow us to extend our network not only horizontally, on a global basis-but vertically, too, right down to the individual soldier...or taking cyber-security and information assurance to the next level:...you've seen today the way we're working at ATO to move beyond the outer-limits, to provide our warfighters the weapons of future war—today.

What you've heard in the last 80 minutes or so is a small but select sampling of the projects and program areas we're looking at to control the battlesphere of the future and give our warfighters the red space advantage. What I'd like to touch on as we close are a few of the new initiatives that are generating excitement within ATO as we continue the quest to move beyond the outer-limits of warfare as we've known it.

Jim Freebersyser has already touched on two of the new initiatives I want to spotlight. The first is THOR—ATO's TeraHertz Operational Reachback program—our effort to exploit the vast terrestrial fiber infrastructure by merging it with free space laser communications links, to give the deployed commander exceptionally high data rate connectivity back to the U.S. With THOR, the deployed commander can minimize his in-theater footprint and still have access to the highest fidelity and most timely information.

Jim and Pres also touched on the next new initiative I want to highlight: XG Communications. Here is a program that has immense technology benefits with real potential to dramatically improve the flexibility and speed of employment of our military systems, and still more significant benefits to civilian applications. In XG, we are developing a technology that can address a significant impasse between conflicting national security, economic, and civil needs. This effort is just getting underway, and we're going to see several significant opportunities for participation over the next few years.

The third new initiative is one we didn't mention in our presentations. It's one we call Connectionless Networking. We all know the speed at which technology is making advances in miniaturizing and reducing power requirements for sensor, processing, and communications equipment. In many area of electronics we have seen almost limitless growth in capability, vis-a-vis the often cited Moore's Law. In communications, we have inherent limitations imposed by natural noise, aperture size, and physics. For example, the irreducible, minimum energy required to communicate a bit. ATO is planning a program in connectionless networking, looking to achieve a three to five order of magnitude reduction in the energy required to move a message from the command center to the soldier in the field.

In this and related programs, our approach is to rethink the process by which we acquire and maintain communications links, the way we manage the network and route packets in order to dramatically increase the efficiency with which we use all communications resources. We're looking at ways to use our knowledge of position and velocity, for instance, to pre-correct for Doppler and propagation delay. We're looking at multiple hypothesis coherent tracking and ad-hoc routing algorithms—approaches that provide inherent advantages for LPI and LPD, spectrum utilization, energy, and thermal management.

Just recently, another new initiative got underway called SALTI or Synthetic Aperture Lidar for Tactical Imaging. This program will develop and demonstrate an airborne interferometric synthetic aperture lidar imager capable of producing high-resolution three-dimensional imagery at long ranges. Imagine the implications of getting high resolution images at twice the distance using one sixth the aperture size compared to the current capability.

In these new initiatives, as in the existing programs we've profiled [this afternoon, ATO's mission is to move beyond the outer limits of warfare...to bring an unconventional approach to conventional but critical military

missions...through break-the-mold basic research, but also through concrete products, with concrete pay-off in combat, and quite often, in the civil sector as well.

As is always the case in the DARPA cycle, a number of our existing programs are coming to completion, new initiatives are ramping up, and new program managers coming on board—but for all that change, the attitude that animates ATO is the one constant that will continue to make our technology office a key contributor to national security for years to come.

So let me thank my ATO team, including all the people who aren't up on the podium today, for their tremendous contribution to the success of the Advanced Technology Office, and for bringing not just enormous expertise and insight to the job, but a level of energy and enthusiasm—passion and purpose—that speaks to the very best in public service. You've shown me every day that ATO has what it takes to move beyond the outer-limits of warfare.

With our most promising programs moving forward, with some exciting new initiatives coming online, all we need right now is that 100th physicist I talked about.

ATO is always looking for the best and brightest, which is one of the reasons we're here today. Our door is always open to the best new ideas from the brightest minds in the private sector or in public service. What has been demonstrated in ATO is that the quality of our programs is directly related to the quality of our people—the talent behind the technology that takes us forward.

We've chosen the projects we profiled today based not only on their value as programs, but as indicators of the attitude that animates ATO—the mindset behind the mission. And on the subject of attitude, I'll be candid: All of us in ATO know we've earned a bit of a reputation as being cunning and devious. Let me say right off—we don't waste a lot of energy trying to live that down. In fact, if there's one thing I've learned in my time at ATO, it's this: Don't expect us to bang down the front door if we can find a window open around back.

Because as much as ATO is open to every novel idea and non-traditional approach, there is one thing none of us have any interest in whatsoever. We're not interested in preparing U.S. forces for a fair fight. In fact, we want our forces to have an absolutely invincible advantage—nothing "fair" about it. If we're in a situation where U.S. Forces are sent into the fray, we want to see them equipped with every advantage of deception, every element of surprise, every opportunity to sow confusion in the enemy's ranks—every tool and technology that gives our forces an edge no adversary can overcome.

What animates us at ATO is a vision that takes us beyond the outer-limits, to the battlesphere of the future. At the upper reaches, a battery of flying switch nodes orbits the battlespace, self-organizing networks that find their own frequencies, open to our allies, impenetrable to our enemies—networks that organize themselves autonomously, without human intervention: on the battlefield itself, scatterable devices capable of jamming a radar, or repropagating a minefield even as an adversary thinks he's cleared it...on the field pack of every warfighter, an all-points information web that links each warfighter to his comrades, and all of them to theater command—real-time, all the time.

As I said when I started today: It's all about control. Control the battlesphere and you control the outcome. Define its outer limits and you define victory—on your terms.

So whether it's in the next hour or next week or next month, I want to encourage everyone here who shares the ATO attitude to seek us out and sound us out on the concepts that will help us move beyond the outer-limits of warfare. That will help us extend our red space advantage. And in this uncertain world, sustain the strength we need to secure and safeguard America's interests and America's ideals.